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Control and Prevention of Meningococcal Disease: Recommendations of the Advi Immunization Practices (ACIP)

Summary

These recommendations update information regarding the polysaccharide vaccine licensed in the United States for use against disease caused by Neisseria meningitidis sero chemoprophylaxis against meningococcal disease (superseding MMWR 1985;34:255-9). This report provides additional information regarding meningococcal vaccines and alternatives to rifampin for chemoprophylaxis in selected populations.

INTRODUCTION

Neisseria meningitidis causes both endemic and epidemic disease, principally meningitis and meningococcemia (1). As a result of the control of Haemophilus influenzae typ of bacterial meningitis in children and young adults in the United States, with an estimated 2,600 cases each year (2). The case-fatality rate is 13% for meningitic disease (de fluid) and 11.5% for persons who have N. meningitidis isolated from blood (2), despite therapy with antimicrobial agents (e.g., penicillin) to which U.S. strains remain clinic

The incidence of meningococcal disease peaks in late winter to early spring. Attack rates are highest among children 3-12 months of age and then steadily decline among old conducted during 1989-1991, serogroup B organisms accounted for 46% of all cases and serogroup C for 45%; serogroups W-135 and Y and strains that could not be seroty data indicate that the proportion of cases caused by serogroup Y strains is increasing (4). Serogroup A, which rarely causes disease in the United States, is the most common localized community outbreaks of serogroup C disease and a statewide serogroup B epidemic have recently been reported (5,6).

Persons who have certain medical conditions are at increased risk for developing meningococcal infection. Meningococcal disease is particularly common among persons w complement pathway (C3, C5-C9); many of these persons experience multiple episodes of infection (6). Asplenic persons also may be at increased risk for acquiring mening Persons who have other diseases associated with immunosuppression (e.g., human immunodeficiency virus {HIV} and Streptococcus pneumoniae) may be at higher risk for some other encapsulated bacteria. Evidence suggests that HIV-infected persons are not at substantially increased risk for epidemic serogroup A meningococcal disease (9); h meningococcal disease or disease caused by other meningococcal serogroups (10). Previously, military recruits had high rates of meningococcal disease, particularly serogro vaccination of recruits with the bivalent A/C meningococcal vaccine in 1971, the high rates of meningococcal disease caused by those serogroups have decreased substantia routinely receive the quadrivalent A,C,Y, W-135 meningococcal vaccine.

MENINGOCOCCAL POLYSACCHARIDE VACCINE

The quadrivalent A,C,Y,W-135 vaccine (Menomune -A,C,Y,W-135, manufactured by Connaught Laboratories, Inc.) is the formulation currently available in the United Stat subcutaneous injection. Each vaccine dose consists of 50 ug each of the purified bacterial capsular polysaccharides. Menomune is available in single-dose, 10-dose, and 50-d

Vaccine Efficacy

The immunogenicity and clinical efficacy of the serogroups A and C meningococcal vaccines have been well established. The serogroup A polysaccharide induces antibody response comparable with that among adults is not achieved until 4 or 5 years of age; the serogroup C component is poorly immunogenic in recipients who are less than 18-2 have demonstrated estimated clinical efficacies of 85%-100% in older children and adults and are useful in controlling epidemics (9,14-17). Serogroups Y and W-135 polysa greater than 2 years of age (18-21); although clinical protection has not been documented, vaccination with these polysaccharides induces bactericidal antibody. The antibod quadrivalent vaccine are serogroup-specific and independent.

Duration of Efficacy

Measurable levels of antibodies against the group A and C polysaccharides decrease markedly during the first 3 years following a single dose of vaccine (13,22-25). This de children than in adults. Similarly, although vaccine-induced clinical protection probably persists in schoolchildren and adults for at least 3 years, the efficacy of the group A passage of time: in a 3-year study, efficacy declined from greater than 90% to less than 10% among children who were less than 4 years of age at the time of vaccination, wh years of age when vaccinated, efficacy was 67% 3 years later (26).

RECOMMENDATIONS FOR USE OF MENINGOCOCCAL VACCINE

Routine vaccination of civilians with the quadrivalent meningococcal polysaccharide vaccine is not recommended because of its relative ineffectiveness in children less thar highest) and its relatively short duration of protection. However, the polysaccharide meningococcal vaccine is useful for controlling serogroup C meningococcal outbreaks (

Indications for Use

In general, use of polysaccharide meningococcal vaccine should be restricted to persons greater than or equal to 2 years of age; however, children as young as 3 months of a serogroup A meningococcal disease (two doses administered 3 months apart should be considered for children 3-18 months of age) (28).

Routine vaccination with the quadrivalent vaccine is recommended for certain high-risk groups, including persons who have terminal complement component deficiencies a whose spleens have been removed because of trauma or nonlymphoid tumors and persons who have inherited complement deficiencies have acceptable antibody responses t vaccination has not been documented for these persons, and they may not be protected by vaccination (7,29). Research, industrial, and clinical laboratory personnel who rou aerosolized should be considered for vaccination.

Vaccination with the quadrivalent vaccine may benefit travelers to and U.S. citizens residing in countries in which N. meningitidis is hyperendemic or epidemic, particularly dose vials of the quadrivalent vaccine are now available and may be more convenient than multidose vials for use in international health clinics for travelers (30). Epidemics Saharan Africa known as the "meningitis belt," which extends from Senegal in the west to Ethiopia in the east (Figure 2) (31). Epidemics in the meningitis belt usually occu vaccination is recommended for travelers visiting this region during that time. Epidemics occasionally are identified in other parts of the world and recently have occurred in Burundi, and Mongolia. Information concerning geographic areas for which vaccination is recommended can be obtained from international health clinics for travelers, state

Primary Vaccination

For both adults and children, vaccine is administered subcutaneously as a single 0.5-mL dose. The vaccine can be administered at the same time as other vaccines but at a di
Protective levels of antibody are usually achieved within 7-10 days after vaccination.

Revaccination

Revaccination may be indicated for persons at high risk for infection (e.g., persons remaining in areas in which disease is epidemic), particularly for children who were first
children should be considered for revaccination after 2-3 years if they remain at high risk. Although the need for revaccination of older children and adults has not been dete
indications still exist for immunization, revaccination may be considered within 3-5 years.

PRECAUTIONS AND CONTRAINDICATIONS Reactions to Vaccination

Adverse reactions to meningococcal vaccine are mild and consist principally of pain and redness at the injection site, for 1-2 days. Estimates of incidence of mild-to-modera
greater than 40% among vaccine recipients (32,33). Pain at the site of injection is the most commonly reported adverse reaction, and a transient fever might develop in less t

Vaccination During Pregnancy

Studies of vaccination during pregnancy have not documented adverse effects among either pregnant women or newborns (34,35). In addition, these studies have documente
following vaccination during pregnancy. Antibody levels in the infants decreased during the first few months after birth; subsequent response to meningococcal vaccination
confirmed in more recent studies of other polysaccharide vaccines administered during pregnancy (36). Based on data from studies involving use of meningococcal vaccines
pregnancy, altering meningococcal vaccination recommendations during pregnancy is unnecessary.

PROSPECTS FOR NEW MENINGOCOCCAL VACCINES

To enhance the immunogenicity and protective efficacy of A and C polysaccharides in infants and young children, methods similar to those used for H. influenzae type b cor
serogroups A and C vaccines (37,38). Capsular polysaccharides are being covalently linked to carrier proteins to convert the T-cell-independent polysaccharide to a T-cell-d
evaluated.

Because the serogroup B capsular polysaccharide is poorly immunogenic in humans, vaccine development for serogroup B meningococci has focused on the outer membran
protective efficacy of several outer membrane protein vaccines against several serogroup B meningococci have been evaluated recently. Evaluation of those vaccines docum
children and adults (39-41). However, a subsequent study of one of these vaccines did not document efficacy in children less than 4 years of age, the group often at highest r
B meningococcal vaccines are licensed for use in the United States.

ANTIMICROBIAL CHEMOPROPHYLAXIS

Antimicrobial chemoprophylaxis of close contacts of sporadic cases of meningococcal disease is the primary means for prevention of meningococcal disease in the United S
members, b) day care center contacts, and c) anyone directly exposed to the patient's oral secretions (e.g., through kissing, mouth-to-mouth resuscitation, endotracheal intuba
household contacts exposed to patients who have sporadic meningococcal disease has been estimated to be four cases per 1,000 persons exposed, which is 500-800 times gr
secondary disease for close contacts is highest during the first few days after onset of disease in the primary patient, antimicrobial chemoprophylaxis should be administered
identified). Conversely, chemoprophylaxis administered greater than 14 days after onset of illness in the index case-patient is probably of limited or no value. Oropharyngea
need for chemoprophylaxis and may unnecessarily delay institution of this preventive measure.

Rifampin is administered twice daily for 2 days (600 mg every 12 hours for adults, 10 mg/kg of body weight every 12 hours for children greater than or equal to 1 month of
of age). Rifampin is effective in eradicating nasopharyngeal carriage of N. meningitidis (44). Rifampin is not recommended for pregnant women, because the drug is teratog
urine to reddish-orange and is excreted in tears and other body fluids; it may cause permanent discoloration of soft contact lenses. Because the reliability of oral contraceptiv
be given to using alternate contraceptive measures while rifampin is being administered.

In addition to rifampin, other antimicrobial agents are effective in reducing nasopharyngeal carriage of N. meningitidis. Ciprofloxacin in various dosage regimens is greater
(45,46). A single 500-mg oral dose of ciprofloxacin is a reasonable alternative to the multidose rifampin regimen. Ciprofloxacin levels in nasal secretions far exceed the MI
Ciprofloxacin is not generally recommended for persons less than 18 years of age or for pregnant and lactating women because the drug causes cartilage damage in immatur
consensus report has concluded that ciprofloxacin can be used for chemoprophylaxis of children when no acceptable alternative therapy is available (48).

When ceftriaxone was administered in a single parenteral dose (an intramuscular dose of 125 mg for children and 250 mg for adults), it was 97%-100% effective in eradicati
ceftriaxone (diluted in 1% lidocaine to reduce local pain after injection) is also a reasonable alternative for chemoprophylaxis.

Systemic antimicrobial therapy of meningococcal disease with agents other than ceftriaxone or other third-generation cephalosporins may not reliably eradicate nasopharyng
used for treatment, the index patient should receive chemoprophylactic antibiotics for eradication of nasopharyngeal carriage before being discharged from the hospital (51)

CONCLUSIONS

N. meningitidis is the leading cause of bacterial meningitis in older children and young adults in the United States. The quadrivalent A, C, Y, and W-135 meningococcal vac
of serogroup C meningococcal disease outbreaks and for use among certain high-risk groups, including a) persons who have terminal complement deficiencies, b) persons w
personnel who routinely are exposed to N. meningitidis in solutions that may be aerosolized. Vaccination also may benefit travelers to countries in which disease is hyperenc
meningococcal vaccines are being developed by using methods similar to those used for H. influenzae type b conjugate vaccines, and the efficacies of several experimental s
in older children and young adults.

Antimicrobial chemoprophylaxis of close contacts of patients who have sporadic cases of meningococcal disease is the primary means for prevention of meningococcal dise
for chemoprophylaxis; however, data from recent studies document that single doses of ciprofloxacin or ceftriaxone are reasonable alternatives to the multidose rifampin reg

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Figure_1

FIGURE 1. Incidence of meningococcal disease, by age group — selected U.S. areas, 1989–1991

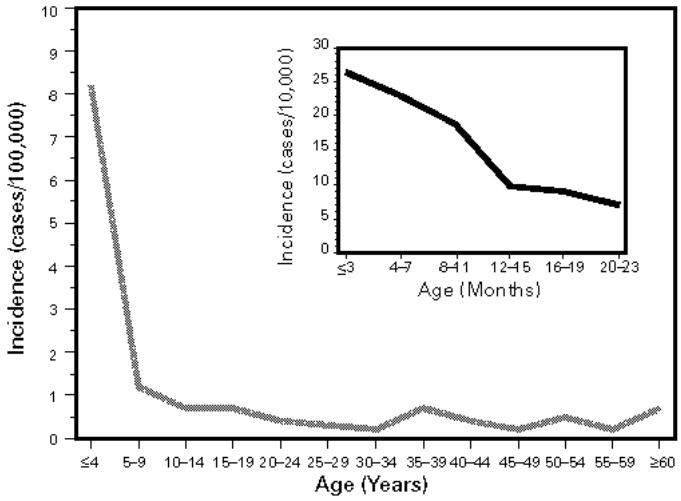

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Figure_2

FIGURE 2. Sub-Saharan meningitis belt

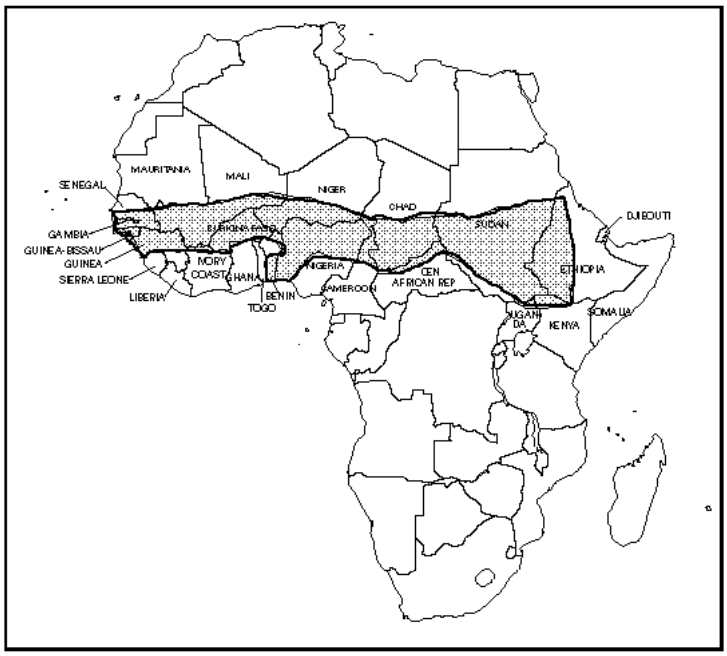

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Table_1

Note: To print large tables and graphs users may have to change their printer settings to landscape and use a small font size.

TABLE. Schedule for administering chemoprophylaxis against meningococcal disease

Drug	Age group	Dosage	Duration and route of administration *
Rifampin	Children <1 mo	5 mg/kg every 12 hrs	2 days
	Children>= mo Adults	10 mg/kg every 12 hrs 600 mg every 12 hrs	2 days 2 days
Ciprofloxacin	Adults	500 mg	Single dose
Ceftriaxone	Children <15 yrs	125 mg	Single IM + dose
	Ceftriaxone Adults	250 mg	Single IM dose

* Oral administration unless indicated otherwise. + Intramuscular.="==========

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